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The Influence of Spiritual Framing on African American Women's Mammography Intentions: A Randomized Trial

ALICIA L. BEST¹, S. MELINDA SPENCER², DANIELA B. FRIEDMAN^{2,3}, INGRID J. HALL⁴,
and DEBORAH BILLINGS^{2,5}

¹Department of Community and Family Health, College of Public Health, University of South Florida, Tampa, Florida, USA

²Department of Health Promotion, Education, and Behavior, Arnold School of Public Health, University of South Carolina, Columbia, South Carolina, USA

³Behavior & Cancer Prevention and Control Program, Arnold School of Public Health, University of South Carolina, Columbia, South Carolina, USA

⁴Division of Cancer Prevention and Control, Centers for Disease Control and Prevention, Atlanta, Georgia, USA

⁵South Carolina Contraceptive Access Campaign, Columbia, South Carolina, USA

Abstract

Spiritual framing of breast cancer communication may provide a useful strategy for addressing disparate rates of breast cancer mortality among African American women. The efficacy of a spiritually framed breast cancer screening (BCS) message was compared with that of a traditional BCS message. Specifically, 200 African American women were randomly assigned to review either a spiritually framed or traditional BCS message and complete a self-administered survey, including a thought-listing form. Message efficacy was measured by number of thoughts generated (elaboration), ratio of positive to negative thoughts (polarity), and intention to obtain and/or recommend a mammogram. Multiple linear regression and structural equation modeling were used to assess direct and indirect (mediated) associations among variables. Spiritual framing was positively associated with greater elaboration ($\beta = .265$, $SE = .36$, $p < .001$) and more positive polarity ($\beta = .237$, $SE = .04$, $p < .001$). Spiritual framing also had a significant indirect effect on mammography intentions through polarity (standardized indirect effect = .057, 95% confidence interval [.024, .106], $p < .001$). These results indicate that spiritual framing may improve the efficacy of BCS messages among African American women by eliciting more positive thoughts about screening. Interventions targeting African American women might consider the role of spirituality when tailoring messages to encourage regular mammography use.

Address correspondence to Alicia L. Best, Department of Community and Family Health, College of Public Health, University of South Florida, 13201 Bruce B. Downs Boulevard, MDC 56, Tampa, FL 33612-3805, USA. abest@health.usf.edu.

Disclaimer

The findings and conclusions in this article are our own and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

Background

African American women bear a disproportionate burden of breast cancer mortality compared to other racial and ethnic groups in the United States (DeSantis, Siegel, Bandi, & Jemal, 2011), and delayed diagnosis remains one of the main factors associated with these higher rates (Chatterjee, He, & Keating, 2013). Despite advances in breast cancer detection methods, many African American women do not obtain timely mammograms. Social determinants such as education, income, and limited access to quality health care services explain much of this disparity (Swan et al., 2010). Additional factors that might influence African American women's decisions regarding breast cancer screening (BCS) have also been identified, such as culturally based beliefs (Gullatte, Phillips, & Gibson, 2006). For example, research has found that African American women are likely to believe that health outcomes are predetermined by a higher power and thus beyond their control (Spurlock & Cullins, 2005). However, empirical studies on the influence of these cultural factors on BCS are scarce.

The Institute of Medicine (2002) report *Speaking of Health: Assessing Health Communication Strategies for Diverse Populations* suggested that “belief systems, religious and cultural values, and group identity are all powerful filters through which information is filtered and processed.” Cultural framing of health promotion messages is a promising strategy for encouraging regular mammography use among African American women (Hall, Rim, Johnson-Turbes, Vanderpool, & Kamalu, 2012; Institute of Medicine, 2002). In particular, spirituality is one of the most predominant characteristics defining African American culture (Hodge & Williams, 2002; Lewis, Hankin, Reynolds, & Ogedegbe, 2007; Pew Research Center, 2007) and has been linked to mammography use among African American women (Gullatte et al., 2006). Recent efforts have explored the role of spirituality as a specific cultural element in framing health communication messages (Holt, 2011; A. Miller & Teel, 2011).

African American women report higher levels of spirituality and religiosity compared to African American men and non-Hispanic White populations (Musgrave, Allen, & Allen, 2002; Strawbridge, Cohen, Shema, & Kaplan, 1997). In the current study, spirituality is operationalized as an intrapersonal belief in a higher power (M. A. Miller, 1995), whereas *religion* is defined as “society-based beliefs and practices relating to God or a higher power commonly associated with a church or organized group” (Egbert, Mickley, & Coeling, 2004, p. 8). Specific to cancer, spirituality has been associated with both positive and negative health outcomes. For example, spirituality has been linked to better coping (i.e., psychosocial adjustment; Cotton, Levine, Fitzpatrick, Dold, & Targ, 1999) and positive behavior change after a cancer diagnosis (Hawkins et al., 2010) among African Americans. Conversely, fatalistic beliefs and delays in breast cancer diagnosis have also been linked to religion and spirituality (Gullatte, Brawley, Kinney, Powe, & Mooney, 2010). Given the complex linkages between spirituality and health outcomes among African American women, it is important to acknowledge the role that these beliefs might play in health promotion.

Theoretical Framework: The Elaboration Likelihood Model of Persuasion (ELM)

The ELM has been recognized for its usefulness in the field of health communication (Holt, Lee, & Wright, 2008; Holt et al., 2011; Kreuter, Oswald, Bull, & Clark, 2000; Price et al., 2011). The ELM describes two distinct ways in which information may be processed: peripheral and central processing. In peripheral processing, messages appeal to the superficial senses, such as visual attraction. Messages that are peripherally processed tend to be easily forgotten, and potential attitude changes will be temporary. Central processing occurs when messages are personally relevant to individuals, which causes an individual to draw on prior knowledge and experiences and thoughtfully elaborate on the messages. Messages that are centrally processed are more likely to be retained and recalled for future reference (Petty & Cacioppo, 1986). Elaboration (i.e., the number of thoughts generated by the message) and polarity (i.e., the ratio of positive to negative thoughts generated by the message) are the two indicators of central message processing (Cacioppo & Petty, 1981). Accordingly, the ELM supports the idea of encouraging thoughtful processing of health information by developing culturally framed messages (Holt et al., 2011).

Current Gaps in the Literature

Health promotion efforts that incorporate spirituality have largely been limited to health interventions placed in church settings (Holt, 2011; Holt et al., 2011; Northington et al., 2011). A recent study by Holt and colleagues (2013) was among the first to use a randomized controlled trial design to examine the efficacy of a spiritually based colorectal cancer educational intervention compared to a nonspiritual intervention in African American churches. Results suggested that women who received the spiritually based intervention experienced significantly greater increases in perceived benefits of screening compared to women who received the nonspiritual intervention (Holt et al., 2013). One could argue that the efficacy of the spiritually based materials in the aforementioned study was due to implementation of the intervention in a church setting. Interventions conducted elsewhere with spiritual and/or religious women may have a different outcome than those conducted in church with the same women.

Moreover, many breast cancer communication studies involve women ages 40 years and older (Hall et al., 2012; Leeks, Hall, Johnson-Turbes, Kamalu, & Zavahir, 2012); however, African American women are more likely than non-Hispanic White women to develop breast cancer before reaching age 40 (American Cancer Society, 2011). In addition, high levels of intergenerational communication among African American women (Mosavel & Genderson, 2013) present a reasonable pathway for younger women who are exposed to BCS messages to relay this information to their older family members. Therefore, including younger women in breast cancer communication research is important.

Study Purpose and Specific Aims

The current study helps to fill gaps in the current literature by going outside of the church setting in order to assess the efficacy of incorporating spirituality into health promotion efforts designed for African American women from a wide age range as well as by exploring mechanisms by which spirituality may influence health behavior. The purpose of this study

was to assess the efficacy of a spiritually framed BCS message compared to a more traditional BCS message among a community-based sample of African American women.

The following specific aims were addressed in this study: (a) Examine whether spiritual framing of BCS messages is associated with increased intention to obtain or recommend a mammogram (i.e., mammography intentions—primary outcome), (b) examine whether spiritual framing of BCS messages is associated with central message processing (i.e., elaboration and polarity—secondary outcomes), and (c) examine the potential mediating role of central message processing in the association between spiritual framing and mammography intentions. For the purpose of this research, spiritual framing was described as the process of incorporating self-reported aspects of an individual's or group's spiritual and/or religious beliefs into a health message.

Methods

Participants and Recruitment

A total of 200 participants were randomized into one of two groups based on the message type: spiritual ($n = 100$) or traditional ($n = 100$). Criteria for inclusion consisted of the following: (a) self-identification as an African American woman; (b) age 25 years and older; and (c) able to read, write, and understand English.

Data were collected between June and September 2012. Using a convenience sampling approach, recruitment took place in seven geographic locations throughout the southeastern and midwestern United States in the following cities: Columbia, South Carolina; Atlanta, Georgia; Houston and Dallas, Texas; Dayton, Ohio; Chicago, Illinois; and Washington, DC. Potential participants were recruited from places such as community centers, breast cancer events, health fairs, churches, and so on, and asked whether they would like to participate in a study about breast cancer among African American women. Participants were offered a \$5 cash honorarium for completing the survey. Study participants were referenced by a unique identification number, and all data were kept in a locked file cabinet accessible only to the principal investigator. This study was approved by the institutional review board at the University of South Carolina.

Materials

The traditional BCS message used in this study was developed by the Centers for Disease Control and Prevention as part of the African American Women and Mass Media campaign, a promotional health communication program aimed at motivating African American women to obtain mammograms (Hall, Johnson-Turbes, Berkowitz, & Zavahir, 2015; Hall et al., 2012; Leeks et al., 2012). Specifically, the traditional BCS message was an 8.5 × 11" print-based, color document that contained an image of three African American women of various ages. The top banner of the message contained the text "You can't put a price on life" along with the following informational paragraph:

The sooner you have a mammogram, the greater your chances are of finding cancer in its early stages and making a full recovery. We are here to help you by providing

mammograms at no cost at our facilities run by qualified medical professionals. It's a small price with big benefits for your life.

The spiritually framed BCS message was developed by adapting the traditional message in consultation with African American women to incorporate spiritual elements. Using nominal group technique and one-on-one interviews, African American women provided input on spiritual elements that were pertinent to them. Specific details about this process are published elsewhere (Best, Spencer, Hall, Friedman, & Billings, 2015). The final spiritually framed message contained a top banner with the text "Your body is a temple" along with following informational paragraph:

The sooner you have a mammogram, the greater your chances are of finding cancer in its early stages and making a full recovery. We provide mammograms at no cost at our medical facilities. You are not given the spirit of fear but of power over your health. Visiting a medical professional does not mean you lack faith—it means you are acting on your faith.

The spiritually framed message differed from the traditional message in only the spiritual content (i.e., it had an identical image, colors, amount of text, etc.) so that the message content could be tested independently (Best et al., 2015). The traditional and spiritually framed BCS messages are shown in Figure 1.

Measures

Demographic and Health-Related Variables—The survey captured demographic characteristics, including participants' age, education level (less than high school, high school diploma or general equivalency diploma, some college but no degree, college degree, some graduate school but no advanced degree, advanced degree), household income (less than \$10,000, \$10,000–\$24,999, \$25,000–\$39,999, \$40,000–\$49,999, \$50,000–\$74,999, \$75,000 or more, not applicable), and marital status (married, single, partnered, divorced, widowed, separated). Health-related information obtained from the survey included insurance status (private insurance, Medicare, Medicaid, out of pocket, not applicable), ever had a family member or friend diagnosed with breast cancer (yes or no), personal history of breast cancer (yes or no), and whether the respondent had a medical home (yes or no).

Spirituality and Religiosity—Spirituality and religiosity, two important covariates, were assessed using two subscales from the Ironson-Woods Spirituality/Religiousness Index Short Form: Compassionate View of Others (representing spirituality) and Religious Behavior (representing religiosity; Ironson et al., 2002). Each subscale contained five items that were measured using a 5-point Likert-type scale ranging from *strongly agree* (5) to *strongly disagree* (1). Sample spirituality items included "My beliefs teach me to help other people who are in need" and "I feel I am connected to all humanity." Sample religiosity items included "I attend service religious service regularly" and "My beliefs give me a set of rules I must obey." Items were summed to achieve an overall spirituality score and an overall religiosity score (range = 5–25), with higher scores indicating higher levels of spirituality and religiosity, respectively. Reliability (α) for the spirituality and religiosity scales was .87 and .85, respectively. It was important to assess and control for varying levels of spirituality and religiosity because of their potential influence on message processing.

Issue Involvement—An important covariate, issue involvement, was assessed in order to control for its potential influence on mammography intentions. Issue involvement was defined as general concern with breast cancer and was measured using three items from Finney and Iannotti's (2001) involvement scale ($\alpha = .71$). Items included "How much concern is breast cancer to you?" "How much do you read articles about breast cancer?" and "How much do you pay attention to media about breast cancer?" These items were measured on a 7-point Likert-type scale ranging from *a great deal* (7) to *not at all* (1). Items were summed (range = 3–21), with higher scores indicating higher levels of the construct.

Mammography Intentions—The primary outcome in this study, mammography intentions, was measured by asking about both the individual's intention to obtain a mammogram and her intention to recommend a mammogram to a loved one. It was important to assess both intention to obtain and intention to recommend a mammogram given the age criteria for study participation and the likelihood that health messages are often delivered through intergenerational communication (Mosavel & Genderson, 2013). Prior to being exposed to the BCS message (prestimulus), participants were asked four questions regarding their mammography intentions at baseline. Sample items included "How likely are you to have a mammogram when you are due to obtain one?" and "How likely are you to recommend that women in your life get a mammogram when they are due for one?" Participants were asked the same questions after they viewed the BCS message, prefaced with the following: "After reading the breast cancer screening message . . ." These items were measured on a 7-point Likert-type scale ($\alpha = .87$) ranging from *very likely* (7) to *not likely at all* (1). A total score (range = 4–28) was obtained by summing the four items, with higher scores indicating greater mammography intentions.

Cognitive Response: Elaboration and Polarity—The secondary outcome and potential mediator in this study, *cognitive response*, refers to "thoughts that pass through a person's mind as he or she anticipates, receives, or reflects upon a message designed to change beliefs, attitudes, or behaviors" (Cacioppo & Petty, 1981, p. 310). Cognitive response was assessed on two dimensions: (a) the number of thoughts generated by the message (elaboration) and (b) the ratio of positive to negative thoughts generated by the message (polarity).

Elaboration was measured using the open-ended thought-listing technique (Cacioppo & Petty, 1981). The instructions stated, "Now that you have seen the breast cancer message, we would like you to write down all of the thoughts and feelings that you had as you read it." This information was recorded on a preformatted form that included 12 blank lines on which participants were directed to write their thoughts.

Polarity denotes "the degree to which the response is in favor of or opposed to the referent" (Cacioppo & Petty, 1981, p. 310). After each blank line, participants were instructed to "circle whether that thought is positive, negative, or neutral (neither positive nor negative)." Because participants listed only one thought per line, responses were treated as discrete units, whereby each line of text was considered one unit. In instances when a single thought took up multiple lines, the principal investigator determined the unit by assessing whether more than one polarity rating was circled.

Procedure

Participants completed a self-report survey instrument that was separated into two parts: (a) Background Information and (b) Message Assessment. Part 1 included items assessing demographic and health-related characteristics, level of spirituality and religiosity, issue involvement (i.e., general concern with breast cancer), and mammography intentions. Part 2 of the survey assessed the individual's cognitive response to either the spiritually framed or traditional BCS message. The initial survey instrument was pilot-tested with 48 African American women ages 25 years and older before the official start of data collection. The pilot test revealed certain issues with item wording and overall formatting, which were addressed in the final version of the survey. For example, several pilot participants got confused when some Likert scale items went from low to high whereas others went from high to low. As a result, all Likert scale response categories were formatted so that higher values were on the left and lower values were on the right. The final version of the survey took an average of 18 minutes to complete.

Survey packets were preassembled and placed in 9 × 12" envelopes. Each envelope included a letter of invitation to participate in the study, either a spiritually framed or traditional BCS message printed in color, and a self-administered survey. Each study packet was labeled with a unique identification number and randomly assigned to either the spiritually framed or traditional BCS message group. Once the packets were sealed, research team members were unaware which message was contained in each package to prevent experimenter bias. A flow diagram depicting randomization procedures is shown in Figure 2.

Statistical Analyses

A series of a priori power analyses were conducted using SPSS SamplePower software, which indicated that a sample size of 200 was sufficient to detect medium-size effects with at least 80% power for all bivariate and multivariate analyses. In addition, the sample size necessary for structural equation modeling (SEM) was determined using Kline's (1998) recommendation of a minimum of 10 cases per parameter. Data were analyzed at the 95% confidence level with an alpha level of .05 using SPSS Version 22 (IBM Corporation, 2013) and SPSS AMOS Version 22 (Arbuckle, 2013).

Chi-square tests (categorical variables) and *t* tests (continuous variables) were conducted to assess bivariate differences in demographic and health-related variables between the spiritually framed and traditional groups. Independent-samples *t* tests were also conducted to assess bivariate differences in central message processing between the intervention and control groups. Effect sizes for multivariate analyses are described according to Cohen (1988); standardized beta values of 0.2 indicate a small effect size, 0.5 indicate a medium effect size, and 0.8 indicate a large effect size.

A series of three multiple linear regression models were used to test the association between message framing and three key outcome variables (elaboration, polarity, and mammography intentions) while adjusting for important covariates. A categorical variable was created to represent message framing (i.e., spiritual vs. traditional). Mammography intention change scores were calculated by subtracting participants' intention scores prior to reviewing the

BCS message (prestimulus) from their scores after reviewing the BCS message (poststimulus). A continuous variable was created representing the total number of thoughts listed on each thought-listing form. Polarity ratios were calculated using the basic formula $P / (P + N)$, with P = number of positive thoughts and N = number of negative thoughts (Schwartz, 1997).

Finally, SEM was used to examine the indirect (mediated) effect of spiritual framing on mammography intentions. An initial structural model was constructed including all possible unidirectional paths among spiritual framing, elaboration, polarity, and mammography intentions, adjusting for significant covariates identified in regression models. The maximum likelihood estimation method and multiple fit indices were used to evaluate overall model fit. Adequate to good model fit was determined by a comparative fit index value between 0.90–0.95 or above (Byrne, 1994), a root mean square error of approximation value <0.06 , and a chi-square value <2.0 with a p value *greater* than .05 (Hu & Bentler, 1995). The final structural model that provided good fit to the data was further assessed for mediation using the bootstrapping resampling method. Bootstrap estimates were based on 2,000 draws with replacement from the current sample. A statistically significant bias-corrected bootstrap 95% confidence interval indicated a significant indirect effect (Preacher & Hayes, 2008).

Results

Sample Description

The final sample of study participants was recruited from the following places: community centers (18%), breast cancer events (34%), health fairs (23%), churches (11%), and other community-based settings (e.g., hair salons, book club meetings, sorority meetings; 14%). Demographics, spirituality, religiosity, and health-related characteristics of the sample are reported in Tables 1 and 2. Participants ranged in age from 25 to 88 years ($M = 48.92$, $SD = 15.36$). Levels of religiosity ($M = 20.7$, $SD = 4.59$) and spirituality ($M = 23.03$, $SD = 2.46$) were relatively high, and most participants rated their overall health as very good (49%) or good (30%), with only 1% rating their health as poor. Approximately 95% of participants indicated that they had never been diagnosed with breast cancer, and approximately 70% of participants reported having a family member or friend who had been diagnosed with breast cancer.

Table 1 compares categorical characteristics of the two randomized groups, and Table 2 compares continuous characteristics of the two randomized groups. There were no significant baseline differences in demographics, health-related characteristics, religiosity, spirituality, issue involvement, or prestimulus mammography intentions between the groups. Participants in the group exposed to the spiritually framed message reported significantly greater elaboration ($M = 5.35$, $SD = 2.35$) compared to the traditional group ($M = 3.97$, $SD = 2.58$; $p < .001$), and participants in the spiritual group reported significantly greater polarity ($M = .89$, $SD = .25$) compared to the traditional group ($M = .72$, $SD = .35$; $p < .001$).

Linear Regression Analyses

Each regression model adjusted for demographics, religiosity, spirituality, and issue involvement. Prestimulus mammography intention was included only in the model predicting mammography intention change score. Nonsignificant predictors were removed from each model. In the first model, spiritual framing ($\beta = .265$, $SE = .35$, $p < .001$) was positively associated with greater elaboration with a small effect size, and this model accounted for 7% of the variance in message elaboration ($R^2 = .07$; data not shown). In the second model, spiritual framing ($\beta = .237$, $SE = .04$, $p < .001$) and religiosity ($\beta = .263$, $SE = .005$, $p = .028$) were associated with more positive polarity with small effect sizes, and this model accounted for 14% of the variance in polarity ($R^2 = .14$; see Figure 3).

In the final model, spiritual framing was not associated with mammography intentions; however, issue involvement ($\beta = .224$, $SE = .07$, $p < .001$) was positively associated with mammography intentions with a small effect size, and prestimulus mammography intention ($\beta = -.637$, $SE = .06$, $p < .001$, $R^2 = .34$) was negatively associated with mammography intention change score with a medium effect size. That is, the greater a woman's intentions to obtain or recommend a mammogram were before she reviewed the BCS message, the less likely she was to report changes in mammography intentions after the stimulus.

Mediation Analysis

Finally, SEM was used to examine the indirect (mediated) effect of spiritual framing on mammography intentions through central message processing (i.e., elaboration and polarity) while adjusting for significant covariates. Nonsignificant paths were dropped from the model to improve model fit. The final structural model that yielded good fit to the data is presented in Figure 3, $\chi^2 (df = 4) = 2.84$, $p = .58$, comparative fit index = 1.00, root mean square error of approximation = .00, 95% confidence interval [.000, .092]. When we controlled for the effect of prestimulus mammography intentions and level of religiosity, spiritual framing had a significant indirect effect on mammography intentions through polarity (standardized indirect effect = .057, 95% confidence interval [.024, .106], $p < .001$).

Discussion

The overall goal of this study was to evaluate the efficacy of a spiritually framed BCS message for increasing central message processing compared with a more traditional BCS message among African American women. Compared to the traditional message, the spiritually framed message was associated with more thoughtful processing as measured by greater elaboration and increased positive thoughts. Furthermore, subsequent mediation analysis revealed that it was through increased positive thoughts that spiritual framing was associated with greater mammography intentions.

Holt and colleagues (2008) found no significant difference in behavioral intention between African American women who reviewed spiritually based breast cancer educational materials and women who reviewed more traditional materials. However, these findings did not account for potential indirect effects of the spiritually based materials on behavioral intention through other variables. Findings from the present study provide evidence that

increased positive thoughts may provide a mechanism through which spiritual framing can influence mammography intentions. Future studies should consider the importance of central message processing when evaluating the efficacy of spiritually based health communication.

Despite previous studies connecting spirituality and/or religiosity to health outcomes, research on incorporating these concepts into health communication is sparse. This may be due in part to the often conflicting goals of reaching broad audiences while simultaneously attempting to tailor and target materials to individual or group characteristics. Although incorporating spirituality and/or religion into mass communication efforts may not be feasible, emerging technologies provide opportunities for niche communication that can be tailored based on more specific cultural characteristics. For example, the widespread use of mobile technologies presents an avenue to disseminate spiritually framed cancer education messages to individuals via mobile health applications (Davis & Oakley-Girvan, 2015).

Holt (2011) noted that spiritually based health promotion efforts have been used almost solely in faith-based settings and that the church-based setting in and of itself may impact the way in which a given message is perceived. In one particular study, it was determined that reviewing a spiritually framed message in a church setting potentially primed participants to respond favorably to certain messages (Holt, 2011). In addition, the generalizability of such studies is limited. An important strength of the present study is that participants were recruited from a variety of community-based settings, including but not limited to churches. This provided the opportunity to assess the impact of spiritual framing on message processing among individuals from a variety of settings.

Some limitations should be considered when interpreting findings from this study. The use of nonrandom sampling procedures introduces a degree of selection bias and limits the generalizability of results. Furthermore, the sample was not representative of the broader population of African American women in terms of education, income, and health insurance status because low socioeconomic status was not adequately reflected in this study. In addition, mammography intentions were assessed as a proxy for BCS behavior. Although behavioral intention is considered the most proximal predictor of behavior (Ajzen, 2011; Ajzen & Madden, 1986; Fishbein & Ajzen, 1975), numerous extraneous factors influence behavior apart from intention (Murphy, Vernon, Diamond, & Tiro, 2014; Wong & Sheth, 1985). Finally, participants completed the preassessment survey and reviewed the message included in their packet, then immediately completed the postassessment and thought listing. This is not considered an ideal length of time to assess true changes in attitudes. Future studies should incorporate a longitudinal design in order to assess more long-term effects of spiritual framing on mammography intentions and, ultimately, BCS behavior.

This article describes an evidence-based approach to evaluating spiritually framed messages using a randomized controlled trial design. More important, this study provides evidence that spiritually framed BCS messages may elicit more positive thoughts among African American women compared with traditional BCS messages. Findings also suggest that the more positive thoughts generated by the spiritually framed messages may increase mammography intentions. Future studies might explore whether increased mammography intention mediated through spiritual framing translates to increased mammography

screening. Conducting this study outside of the church setting also provides evidence of how deeply embedded spirituality and religiosity are within the African American community. Developing BCS messages that produce positive and reflective processing and increase mammography intentions, as well as disseminating those messages beyond the church setting (e.g., through mobile health applications), are important steps in increasing regular BCS among African American women. Consistent with the literature identifying spirituality as an important cultural concept among African American women, this study has explored a promising strategy for contributing to the reduction in disparities in breast cancer mortality. Spiritual framing of BCS messages could be a feasible approach for helping achieve effective health promotion in the African American community.

References

- Ajzen I. The theory of planned behaviour: Reactions and reflections. *Psychology & Health*. 2011; 26:1113–1127. DOI: 10.1080/08870446.2011.613995 [PubMed: 21929476]
- Ajzen I, Madden TJ. Prediction of goal-directed behavior: Attitudes, intentions, and perceived behavioral control. *Journal of Experimental Social Psychology*. 1986; 22:453–474. DOI: 10.1016/0022-1031(86)90045-4
- American Cancer Society. Breast cancer facts and figures, 2011–2012. 2011. Retrieved from <http://www.cancer.org>
- Arbuckle, JL. AMOS (Version 7.0). Chicago, IL: SPSS; 2013.
- Best AL, Spencer M, Hall IJ, Friedman DB, Billings D. Developing spiritually framed breast cancer screening messages in consultation with African American women. *Health Communication*. 2015; 30:290–300. DOI: 10.1080/10410236.2013.845063 [PubMed: 24837069]
- Byrne, BM. Structural equation modeling with EQS and EQS/ Windows: Basic concepts, applications, and programming. Thousand Oaks, CA: Sage; 1994.
- Cacioppo, JT.; Petty, RE. Social psychological procedures for cognitive response assessment: The thought-listing technique. In: Merluzzi, TV.; Glass, CR.; Genest, M., editors. *Cognitive assessment*. New York, NY: Guilford; 1981. p. 309–342.
- Chatterjee NA, He Y, Keating NL. Racial differences in breast cancer stage at diagnosis in the mammography era. *American Journal of Public Health*. 2013; 103:170–176. DOI: 10.2105/AJPH.2011.300550 [PubMed: 22698058]
- Cohen, J. Statistical power for the behavioral sciences. 2. Hillsdale, NJ: Erlbaum; 1988.
- Cotton SP, Levine EG, Fitzpatrick CM, Dold KH, Targ E. Exploring the relationships among spiritual well-being, quality of life, and psychological adjustment in women with breast cancer. *Psycho-Oncology*. 1999; 8:429–438. DOI: 10.1002/(ISSN)1099-1611 [PubMed: 10559802]
- Davis SW, Oakley-Girvan I. mHealth education applications along the cancer continuum. *Journal of Cancer Education*. 2015; 30:388–394. DOI: 10.1007/s13187-014-0761-4 [PubMed: 25482319]
- DeSantis C, Siegel R, Bandi P, Jemal A. Breast cancer statistics, 2011. *CA: A Cancer Journal for Clinicians*. 2011; 61:408–418.
- Egbert N, Mickley J, Coeling H. A review and application of social scientific measures of religiosity and spirituality: Assessing a missing component in health communication research. *Health Communication*. 2004; 16:7–27. DOI: 10.1207/S15327027HC1601_2 [PubMed: 14979849]
- Finney LJ, Iannotti RJ. The impact of family history of breast cancer on women's health beliefs, salience of breast cancer family history, and degree of involvement in breast cancer issues. *Women & Health*. 2001; 33:17–31. DOI: 10.1300/J013v33n03_02
- Fishbein, M.; Ajzen, I. Belief, attitude, intention and behavior: An introduction to theory and research. Reading, MA: Addison-Wesley; 1975.
- Gullatte MM, Brawley O, Kinney A, Powe B, Mooney K. Religiosity, spirituality, and cancer fatalism beliefs on delay in breast cancer diagnosis in African American women. *Journal of Religion and Health*. 2010; 49:62–72. DOI: 10.1007/s10943-008-9232-8 [PubMed: 19184437]

- Gullatte MM, Phillips J, Gibson L. Factors associated with delays in screening of self-detected breast changes in African-American women. *Journal of National Black Nurses' Association*. 2006; 17:45–50.
- Hall IJ, Johnson-Turbes A, Berkowitz Z, Zavahir Y. The African American Women and Mass Media (AAMM) campaign in Georgia: Quantifying community response to a CDC pilot campaign. *Cancer Causes & Control*. 2015; 26:787–794. DOI: 10.1007/s10552-015-0540-5 [PubMed: 25732344]
- Hall IJ, Rim SH, Johnson-Turbes CA, Vanderpool R, Kamalu NN. The African American Women and Mass Media campaign: A CDC breast cancer screening project. *Journal of Women's Health*. 2012; 21:1107–1113. DOI: 10.1089/jwh.2012.3903
- Hawkins NA, Smith T, Zhao L, Rodriguez J, Berkowitz Z, Stein KD. Health-related behavior change after cancer: Results of the American Cancer Society's studies of cancer survivors (SCS). *Journal of Cancer Survivorship*. 2010; 4:20–32. DOI: 10.1007/s11764-009-0104-3 [PubMed: 19902360]
- Hodge DR, Williams TR. Assessing African American spirituality with spiritual ecomaps. *Families in Society*. 2002; 83:585–595. DOI: 10.1606/1044-3894.57
- Holt, CL. Religiosity, spirituality, and the design of health messages. Thousand Oaks, CA: Sage; 2011.
- Holt CL, Lee C, Wright K. A spiritually based approach to breast cancer awareness: Cognitive response analysis of communication effectiveness. *Health Communication*. 2008; 23:13–22. DOI: 10.1080/10410230701626919 [PubMed: 18443989]
- Holt CL, Litaker MS, Scarinci IC, Debnam KJ, McDavid C, McNeal SF, Martin MY. Spiritually based intervention to increase colorectal cancer screening among African Americans screening and theory-based outcomes from a randomized trial. *Health Education & Behavior*. 2013; 40:458–468. DOI: 10.1177/1090198112459651 [PubMed: 23033548]
- Holt CL, Shipp M, Eloubeidi M, Fouad MN, Britt K, Norena M. Your body is the temple: Impact of a spiritually based colorectal cancer educational intervention delivered through community health advisors. *Health Promotion Practice*. 2011; 12:577–588. DOI: 10.1177/1524839910370421 [PubMed: 21525419]
- Hu, L-T.; Bentler, PM. Evaluating model fit. In: Hoyle, RH., editor. *Structural equation modeling: Concepts, issues, and applications*. Thousand Oaks, CA: Sage; 1995. p. 76-99.
- IBM Corporation. IBM SPSS statistics for Windows (Version 22.0). Armonk, NY: Author; 2013.
- Institute of Medicine. *Speaking of health: Assessing health communication strategies for diverse populations*. Washington, DC: National Academies Press; 2002.
- Ironson G, Solomon GF, Balbin EG, O'Cleirigh C, George A, Kumar M, Woods TE. The Ironson-Woods Spirituality/ Religiousness Index is associated with long survival, health behaviors, less distress, and low cortisol in people with HIV/AIDS. *Annals of Behavioral Medicine*. 2002; 24:34–48. DOI: 10.1207/S15324796ABM2401_05 [PubMed: 12008793]
- Kline, RB. *Principles and practice of structural equation modeling*. New York, NY: Guilford Press; 1998.
- Kreuter MW, Oswald DL, Bull FC, Clark EM. Are tailored health education materials always more effective than non-tailored materials? *Health Education Research*. 2000; 15:305–315. DOI: 10.1093/her/15.3.305 [PubMed: 10977378]
- Leeks KD, Hall IJ, Johnson-Turbes CA, Kamalu N, Zavahir Y. Formative development of a culturally appropriate mammography screening campaign for low-income African-American Women. *Journal of Health Disparities Research and Practice*. 2012; 5:42–61.
- Lewis LM, Hankin S, Reynolds D, Ogedegbe G. African American spirituality a process of honoring God, others, and self. *Journal of Holistic Nursing*. 2007; 25:1–23. DOI: 10.1177/0898010106289857
- Miller A, Teel S. A content analysis of research on religion and spirituality in general communication and health communication journals. *Health Communication*. 2011; 26:615–620. DOI: 10.1080/10410236.2011.560798 [PubMed: 21534022]
- Miller MA. Culture, spirituality, and women's health. *Journal of Obstetric, Gynecologic, & Neonatal Nursing*. 1995; 24:257–264. DOI: 10.1111/j.1552-6909.1995.tb02471.x

- Mosavel M, Genderson MW. From adolescent daughter to mother: Exploring message design strategies for breast and cervical cancer prevention and screening. *Journal of Cancer Education*. 2013; 28:558–564. DOI: 10.1007/s13187-013-0503-z [PubMed: 23813491]
- Murphy CC, Vernon SW, Diamond PM, Tiro JA. Competitive testing of health behavior theories: How do benefits, barriers, subjective norm, and intention influence mammography behavior? *Annals of Behavioral Medicine*. 2014; 47:120–129. DOI: 10.1007/s12160-013-9528-0 [PubMed: 23868613]
- Musgrave CF, Allen CE, Allen GJ. Spirituality and health for women of color. *American Journal of Public Health*. 2002; 92:557–560. DOI: 10.2105/AJPH.92.4.557 [PubMed: 11919051]
- Northington L, Martin T, Walker JT, Williams PR, Lofton SP, Cooper JR, Keller SD. Integrated community education model: Breast health awareness to impact late-stage breast cancer. *Clinical Journal of Oncology Nursing*. 2011; 15:387–392. DOI: 10.1188/11.CJON.387-392 [PubMed: 21810571]
- Petty RE, Cacioppo JT. The elaboration likelihood model of persuasion. *Advances in Experimental Social Psychology*. 1986; 19:123–205.
- Pew Research Center. Forum on religion and public life: A religious portrait of African-Americans. 2007. Retrieved from <http://www.pewforum.org/A-Religious-Portrait-of-African-Americans.aspx>
- Preacher, KJ.; Hayes, AF. Contemporary approaches to assessing mediation in communication research. In: Hayes, AF.; Slater, MD.; Snyder, LB., editors. *The Sage sourcebook of advanced data analysis methods for communication research*. Thousand Oaks, CA: Sage; 2008. p. 13-54.
- Price AE, Corwin SJ, Friedman DB, Laditka SB, Colabianchi N, Montgomery KM. Older adults' perceptions of physical activity and cognitive health: Implications for health communication. *Health Education & Behavior*. 2011; 38:15–24. DOI: 10.1177/1090198110369764 [PubMed: 21191085]
- Schwartz RM. Consider the simple screw: Cognitive science, quality improvement, and psychotherapy. *Journal of Consulting and Clinical Psychology*. 1997; 65:970–983. DOI: 10.1037/0022-006X.65.6.970 [PubMed: 9420358]
- Spurlock WR, Cullins LS. Cancer fatalism and breast cancer screening in African American women. *The ABNF Journal*. 2005; 17:38–43. [PubMed: 16596899]
- Strawbridge WJ, Cohen RD, Shema SJ, Kaplan GA. Frequent attendance at religious services and mortality over 28 years. *American Journal of Public Health*. 1997; 87:957–961. DOI: 10.2105/AJPH.87.6.957 [PubMed: 9224176]
- Swan J, Breen N, Graubard BI, McNeel TS, Blackman D, Tangka FK, Ballard-Barbash R. Data and trends in cancer screening in the United States. *Cancer*. 2010; 116:4872–4881. DOI: 10.1002/cncr.v116:20 [PubMed: 20597133]
- Wong JK, Sheth JN. Explaining intention-behavior discrepancy: A paradigm. *Advances in Consumer Research*. 1985; 12:378–384.



Fig. 1.
Traditional and spiritually framed breast cancer screening messages.

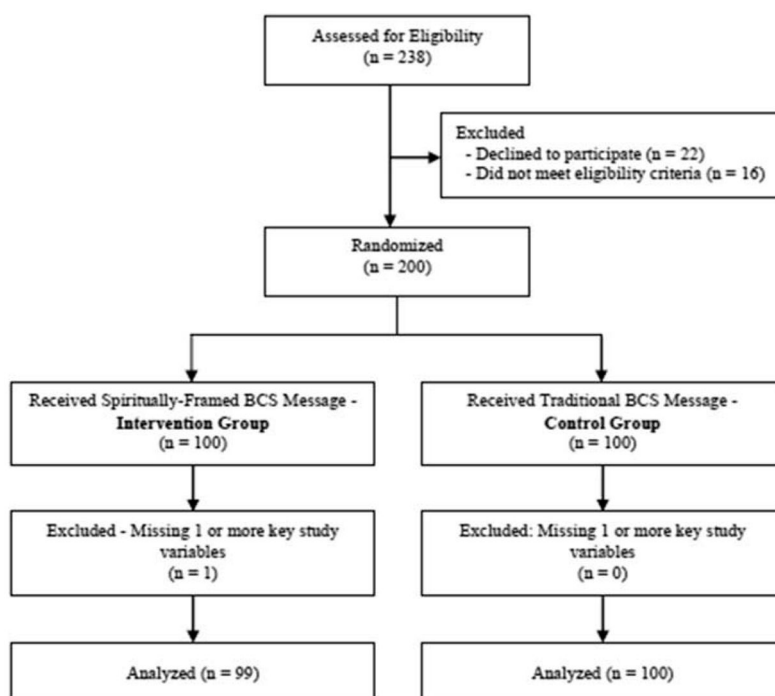


Fig. 2. Flow diagram of randomized trial examining the efficacy of a spiritually framed breast cancer screening (BCS) message compared to a traditional BCS message.

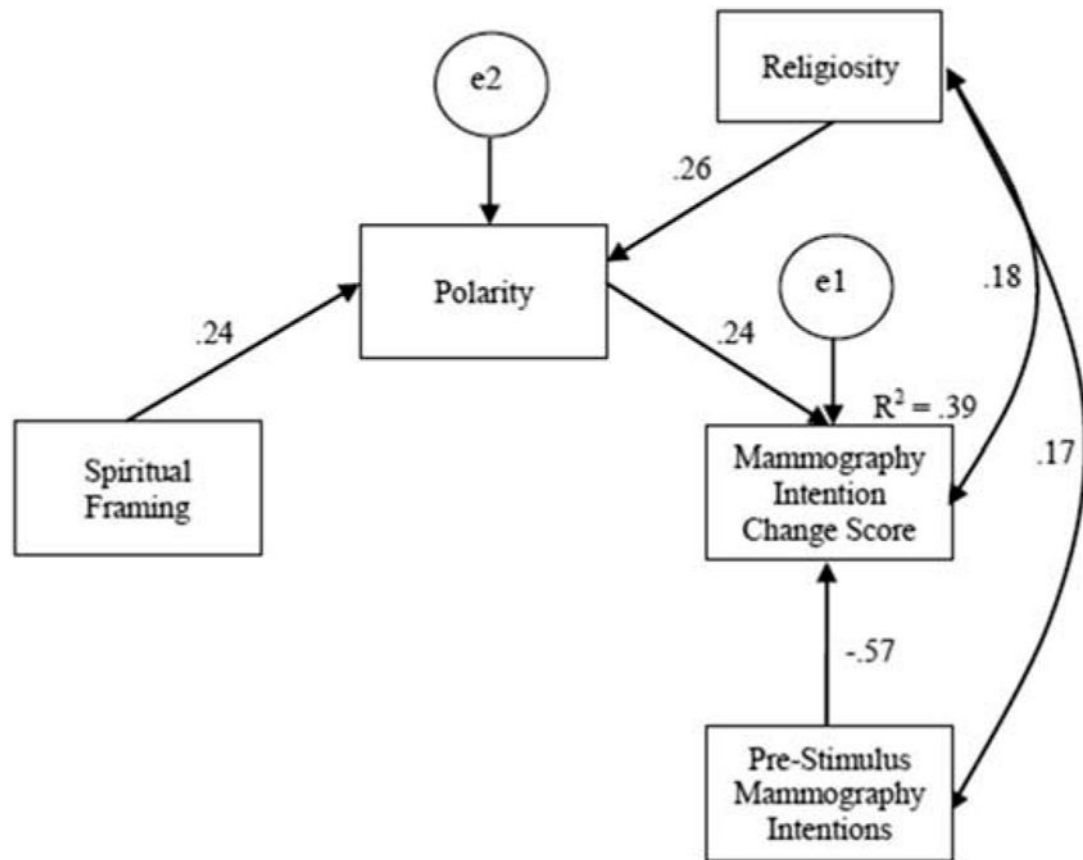


Fig. 3. Standardized path coefficients for final path model describing associations among spiritual framing, polarity, and mammography intentions, adjusting for covariates.

Table 1
Categorical bivariate characteristics of the spiritual group ($n = 99$) compared to the traditional group ($n = 100$)

Characteristic	Spiritual group n (%)	Traditional group n (%)	χ^2	df	p
Education			3.34	3	.34
Less than HS	0 (0.0)	3 (3.0)			
HS diploma/GED	9 (9.1)	11 (11.0)			
Some college	16 (16.2)	16 (16.0)			
College degree or more	74 (74.7)	70 (70.0)			
Income (U.S. dollars)			1.78	2	.41
Less than \$24,999	9 (9.3)	16 (16)			
\$25,000–\$49,999	35 (36.1)	33 (34.4)			
\$50,000+	53 (54.6)	47 (49)			
Marital status					
Married/partnered	40 (40.4)	35 (35)	0.533	1	.47
Not married	59 (69.6)	65 (65)			
Insurance status			0.064	1	.80
Insured	90 (90.9)	92 (92)			
Uninsured	9 (9.1)	8 (8)			
Medical home			0.39	1	.55
Yes	92 (92.9)	96 (96)			
No	7 (7.1)	4 (4)			
Personal history of breast cancer			0.00	1	1.00
Yes	5 (5.1)	5 (5)			
No	94 (94.9)	95 (95)			
Family/friend diagnosed with breast cancer			1.40	1	.24
Yes	65 (65.7)	73 (73)			
No	34 (34.3)	26 (26)			

Note. HS = high school; GED = general equivalency diploma.

Significance indicated by $p < .05$.

Continuous bivariate characteristics of the spiritual group ($n = 99$) compared to the traditional group ($n = 100$)**Table 2**

Characteristic	Range	Spiritual group M (SD)	Traditional group M (SD)	t	df	p
Age	25–88	48.30 (15.06)	49.54 (15.71)	−0.57	196	.57
Religiosity	5–25	21.09 (4.38)	20.23 (4.77)	1.33	197	.19
Spirituality	5–25	23.12 (2.34)	22.94 (2.58)	0.52	197	.61
Issue involvement	3–21	15.64 (4.07)	15.32 (3.64)	0.59	197	.56
Prestimulus intention ^a	4–28	24.85 (5.08)	25.08 (4.44)	0.34	197	.73
Cognitive response						
Elaboration	1–12	5.35 (2.35)	3.97 (2.58)	3.95	197	<.001
Polarity (ratio)	0–1	.89 (.25)	.72 (.35)	3.85	197	<.001

^aBaseline intention to obtain or recommend a mammogram.

Significance indicated by $p < .05$.